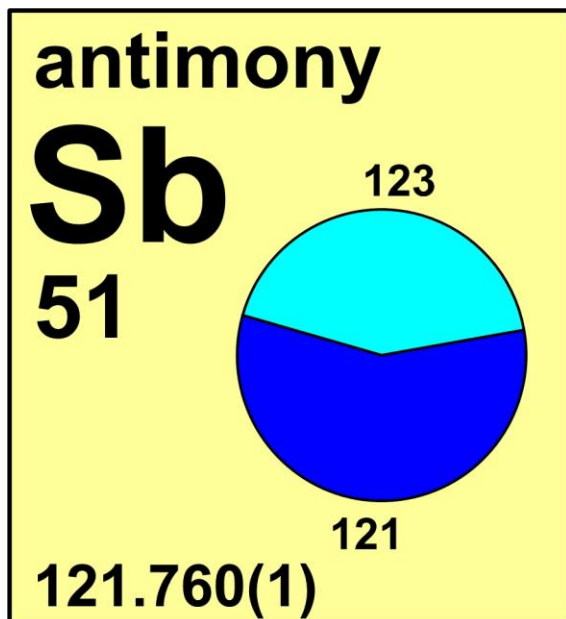


antimony



| Stable isotope | Atomic mass* | Mole fraction |
|-------------------|--------------|---------------|
| ^{121}Sb | 120.903 8157 | 0.5721 |
| ^{123}Sb | 122.904 214 | 0.4279 |

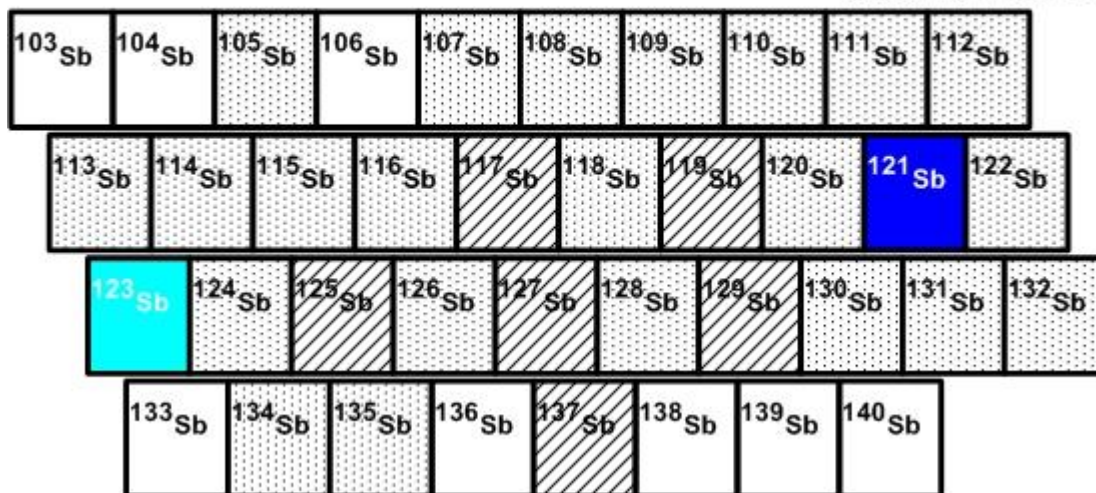
* Atomic mass given in unified atomic mass units, u.

Half-life of radioactive isotope

Less than 1 second

Between 1 second and 1 hour

Greater than 1 hour



Important applications of stable and/or radioactive isotopes

Isotopes in medicine

- 1) ^{123}Sb can be used to produce ^{124}I , which is used in radio-immunotherapy and also in positron emission tomography. Please note that ^{124}I is usually produced via ^{124}Te .
- 2) ^{121}Sb and ^{123}Sb can both be used for the production of ^{123}I via ^3He and alpha particle induced reactions with ^{121}Sb and ^{123}Sb , although the most common production route is via ^{124}Xe or ^{123}Te .

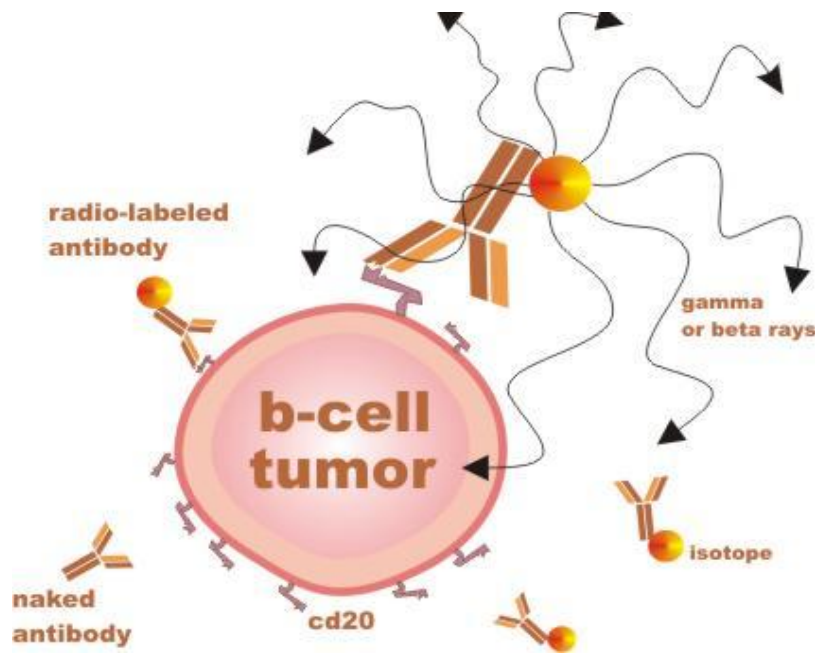


Figure 1: Radio-immunotherapy working against a timorous cell. Manmade antibodies laced with specific radioisotopes are created to target and deteriorate cancerous cells.

Isotopes as environmental tracers

- 1) The ratios of the compositions of stable isotopes $^{121}\text{Sb}/^{123}\text{Sb}$ have been analyzed in many different types of sediments and rocks. Isotopic analysis of Sb in hydrothermal environments expresses a wide range of $^{121}\text{Sb}/^{123}\text{Sb}$ values. This is thought to be because of the differing original Sb sources, such as volcanic rock, sea water etc.
- 2) The ratio of stable isotopes of antimony has potential to be used an environmental tracer in ocean systems.

Isotopes in industry

- 1) Two radioactive isotopes of antimony were used commercially as tracers, especially popular in the 1950's. ^{124}Sb and ^{125}Sb were injected into oil pipelines as a way to detect residence time and flow rate of the substance through the pipeline. The presence of the isotope can be detected by means of a Geiger counter held above the pipeline. If the pipeline has a leak, the tracer will escape and its contamination/movement can be detected in the soil.
- 2) ^{124}Sb and ^{125}Sb are now both treated as environmental contaminants.